Appendix 5

2012 Material Testwork Results

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/14E

TEN PERCENT FINES TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO:	1
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST METHOD**
Determination of the 10% Fines Value (Dry)	Q205A
Determination of the 10% Fines Value (Wet)	Q205B
Wet/Dry Strength Variation	Q205C

SAMPLE IDENTIFICATION

Sample No.:	DK/12/1383	Client Sample No.:	-
Source:	-	Location:	-
Lot No.:	-	Date Sampled:	-
Lot Tonnage:	-	Test Fraction (mm):	6.7-4.75
Sample Tonnage:	-	Cylinder Diameter (mm):	75
Sample ID:	Sample 1	Nominal Size (mm):	150
		Rock Type:	Spalls

TEST RESULTS

Ten Percent Fines, Dry	(kN)	231
Ten Percent Fines, Wet	(kN)	142
Wet/Dry Variation	(%)	38

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements in this document are traceable to Australian/national standards.

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

dg5057li.docx

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK. QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CALIFORNIA BEARING RATIO TEST REPORT (Q113A)

CLIENT: GROUNDWORK PLUS

REPORT No.: 2

PROJECT: -

JOB No.: CQAK/11/022

JOB DESCRIPTION: COMPLIANCE TESTING

DATE: 16 OCTOBER 2012

Sample No.: DK/12/1383

Sample ID: Sample 1

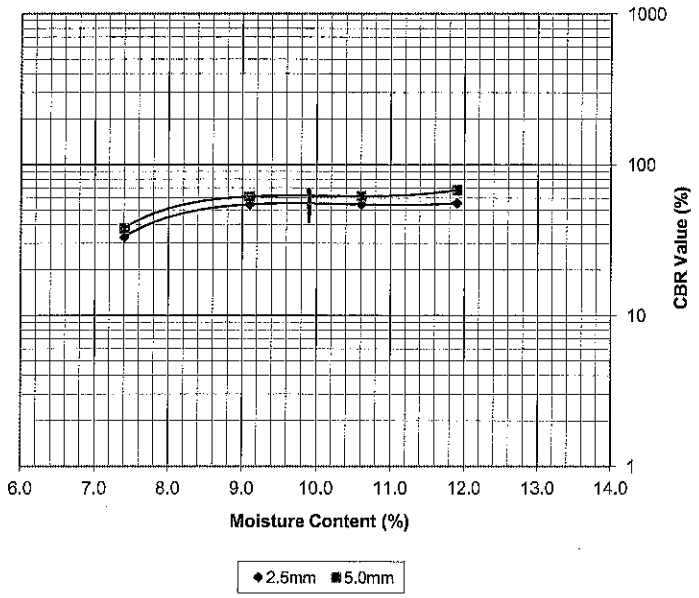
Material Type: -

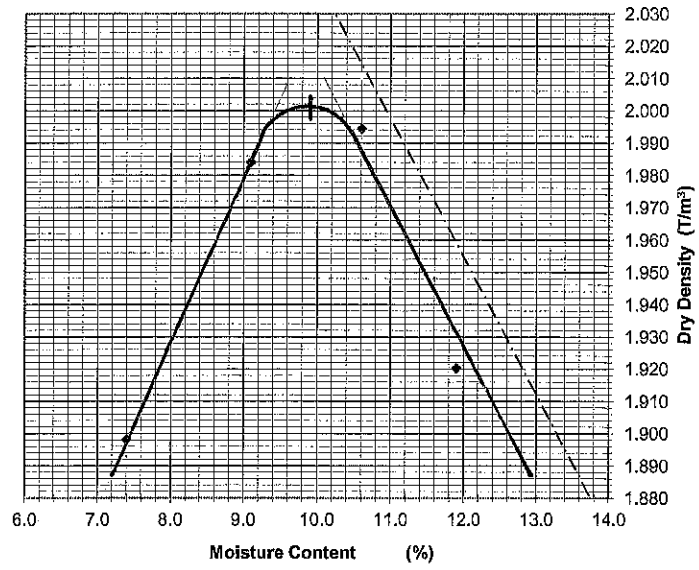
Sample Location: -

Date Sampled: -

Date Tested: 11/10/2012

Sampled By: Client





Initial M.C. (%)	Dry Density (T/m^3)	CBR 2.5mm (%)	CBR 5.0mm (%)	Swell (%)	Final M.C. (%)
7.4	1.898	32	38	0.0	-
9.1	1.984	54	62	0.0	-
10.6	1.994	54	62	0.0	-
11.9	1.920	56	68	0.0	-
-	-	-	-	-	-
-	-	-	-	-	-

Compactive Effort		100 % Standard
Test Condition		Soaked - 4 day
CBR MDD	(T/m^3)	2.00
CBR OMC	(%)	10.0
CBR 2.5mm	(%)	54
CBR 5.0mm	(%)	62
CBR Value	**(%)**	**62**

Sampling Method: Sampled by client, tested as received

Notes: (i) Sample identification supplied by the client and is not endorsed on this report

DG GREGSON

AUTHORISED SIGNATORY

NATA Accreditation No. 4991

NATA

ACCREDITED FOR TECHNICAL COMPETENCE

This document is issued in accordance with NATA's accreditation requirements.

Accredited for compliance with ISO/IEC 17025

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/14E

TEN PERCENT FINES TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO:	3
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST METHOD**
Determination of the 10% Fines Value (Dry)	Q205A
Determination of the 10% Fines Value (Wet)	Q205B
Wet/Dry Strength Variation	Q205C

SAMPLE IDENTIFICATION

Sample No.:	DK/12/1382	Client Sample No.:	-
Source:	-	Location:	-
Lot No.:	-	Date Sampled:	-
Lot Tonnage:	-	Test Fraction (mm):	13.2-9.5
Sample Tonnage:	-	Cylinder Diameter (mm):	150
Sample ID:	Sample 2	Nominal Size (mm):	150
		Rock Type:	Spalls

TEST RESULTS

Ten Percent Fines, Dry	(kN)	325
Ten Percent Fines, Wet	(kN)	296
Wet/Dry Variation	(%)	9

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements in this document are traceable to Australian/national standards.

dg5057li.docx

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/04D

AGGREGATE TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO:	4
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST METHOD**
Particle Size Distribution (Wet or Dry)	Q103B
Flakiness Index	Q201

SAMPLE IDENTIFICATON

Sample No.:	DK/12/1382	Client Sample No.:	-
Source:	-	Sample ID:	Sample 2
Lot No.:	-	Location:	-
Lot Tonnage:	-	Date Sampled:	-
Sample Tonnage:	-		

TEST RESULTS

Particle Size Distribution

Sieve Size (mm)	% Passing
37.5	100
26.5	97
19.0	68
13.2	26
9.5	16
6.7	11
4.75	8.1
2.36	5.0

Flakiness Index (%) 24

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556
OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/08C

DEGRADATION FACTOR TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO.	5
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST METHOD**
Degradation Factor (Coarse Aggregate)	Q208A

SAMPLE IDENTIFICATION

Sample No.:	DK/12/1382	Client Sample No.:	-
Source:	-	Sample ID:	Sample 2
Lot No.:	-	Location:	-
Lot Tonnage:	-	Date Sampled:	-
Sample Tonnage:	-		

TEST RESULTS

Washington Degradation Factor	70

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

dg5059li.docx

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/40A

LOS ANGELES ABRASION TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO:	6
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST PROCEDURE NO.**
Los Angeles Abrasion Value	Q 206

SAMPLE PROCEDURE	**SAMPLE PROCEDURE NO.**
Sampled by client	-

SAMPLE IDENTIFICATION

Laboratory Sample No.		DK/12/1382
Source		-
Sample ID		Sample 2
Location		-
Lot No.		-
Senders No.		-

TEST RESULTS

Test Grading		B 25% Flaky
Los Angeles Abrasion Value	(%)	13

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

dg5060li.docx

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/26C

PARTICLE DENSITY AND WATER ABSORPTION TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO:	7
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST PROCEDURE NO.**
Particle Density and Water Absorption (Coarse Aggregate)	Q214B

SAMPLE IDENTIFICATION

Laboratory Sample No.	DK/12/1382
Source	-
Sample ID	Sample 2
Location	-
Lot No.	-
Senders No.	-

TEST RESULTS

Apparent Particle Density	(t/m^3)	2.732
Particle Density Dry Basis	(t/m^3)	2.711
Particle Density (SSD)	(t/m^3)	2.719
Water Absorption	(%)	0.29

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

dg5061ll.docx

CIVIL QUALITY ASSURANCE (QLD) PTY LTD

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK. QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/035

POLISHED AGGREGATE FRICTION VALUE

CLIENT: GROUNDWORK PLUS — REPORT No.: 8

PROJECT: - — JOB No.: CQAK/11/022

JOB DESCRIPTION: COMPLIANCE TESTING — DATE: 16 OCTOBER 2012

TEST PROCEDURE	**TEST PROCEDURE No.**
Polished Aggregate Friction Value	Q203

SAMPLE INDENTIFICATION

Sample Number:	DK/12/1382
Lot Number:	-
Material Source:	-
Sample Location:	-
Sample ID:	Sample 2
Geological Classification:	-
Date Sampled:	-
Sampled By:	Client
Date Tested:	-

TEST RESULTS

Air Temperature:	(^{0}C)	23
Corrected Initial Reference Friction Value:		75
Reference PAFV:		51
Corrected Initial Test Sample Friction Value:		78
Test Sample PAFV:		**56**

Variation(s) to Test Method:

Remarks:

Sampling Method: Sampled by client, tested as received

Notes: (i) Sample identification supplied by the client and is not endorsed on this report

DG GREGSON

AUTHORISED SIGNATORY

NATA Accreditation No. 4991

NATA

ACCREDITED FOR TECHNICAL COMPETENCE

This document is issued in accordance with NATA's accreditation requirements.

Accredited for compliance with ISO/IEC 17025

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/14E

TEN PERCENT FINES TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO:	9
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST METHOD**
Determination of the 10% Fines Value (Dry)	Q205A
Determination of the 10% Fines Value (Wet)	Q205B
Wet/Dry Strength Variation	Q205C

SAMPLE IDENTIFICATION

Sample No.:	DK/12/1384	Client Sample No.:	-
Source:	-	Location:	-
Lot No.:	-	Date Sampled:	-
Lot Tonnage:	-	Test Fraction (mm):	6.7-4.75
Sample Tonnage:	-	Cylinder Diameter (mm):	75
Sample ID:	Sample 3	Nominal Size (mm):	150
		Rock Type:	Spalls

TEST RESULTS

Ten Percent Fines, Dry	(kN)	219
Ten Percent Fines, Wet	(kN)	153
Wet/Dry Variation	(%)	30

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements in this document are traceable to Australian/national standards.

dg5057li.docx

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/04D

AGGREGATE TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO:	10
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST METHOD**
Particle Size Distribution (Wet or Dry)	Q103B
Flakiness Index	Q201

SAMPLE IDENTIFICATON

Sample No.:	DK/12/1384	Client Sample No.:	-
Source:	-	Sample ID:	Sample 3
Lot No.:	-	Location:	-
Lot Tonnage:	-	Date Sampled:	-
Sample Tonnage:	-		

TEST RESULTS

Particle Size Distribution

Sieve Size (mm)	% Passing
37.5	100
26.5	98
19.0	76
13.2	39
9.5	24
6.7	16
4.75	11
2.36	6.7

Flakiness Index (%) 30

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/08C

DEGRADATION FACTOR TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO.	11
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST METHOD**
Degradation Factor (Coarse Aggregate)	Q208A

SAMPLE IDENTIFICATION

Sample No.:	DK/12/1384	Client Sample No.:	-
Source:	-	Sample ID:	Sample 3
Lot No.:	-	Location:	-
Lot Tonnage:	-	Date Sampled:	-
Sample Tonnage:	-		

TEST RESULTS

Washington Degradation Factor	47

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/40A

LOS ANGELES ABRASION TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO:	12
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST PROCEDURE NO.**
Los Angeles Abrasion Value	Q 206

SAMPLE PROCEDURE	**SAMPLE PROCEDURE NO.**
Sampled by client	-

SAMPLE IDENTIFICATION

Laboratory Sample No.		DK/12/1384
Source		-
Sample ID		Sample 3
Location		-
Lot No.		-
Senders No.		-

TEST RESULTS

Test Grading		B 25% Flaky
Los Angeles Abrasion Value	(%)	15

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

dg5060li.docx

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/26C

PARTICLE DENSITY AND WATER ABSORPTION TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO:	13
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST PROCEDURE NO.**
Particle Density and Water Absorption (Coarse Aggregate)	Q214B

SAMPLE IDENTIFICATION

Laboratory Sample No.	DK/12/1384
Source	-
Sample ID	Sample 3
Location	-
Lot No.	-
Senders No.	-

TEST RESULTS

Apparent Particle Density	(t/m^3)	2.777
Particle Density Dry Basis	(t/m^3)	2.726
Particle Density (SSD)	(t/m^3)	2.745
Water Absorption	(%)	0.67

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/14E

TEN PERCENT FINES TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO:	1
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST METHOD**
Determination of the 10% Fines Value (Dry)	Q205A
Determination of the 10% Fines Value (Wet)	Q205B
Wet/Dry Strength Variation	Q205C

SAMPLE IDENTIFICATION

Sample No.:	DK/12/1383	Client Sample No.:	-
Source:	-	Location:	-
Lot No.:	-	Date Sampled:	-
Lot Tonnage:	-	Test Fraction (mm):	6.7-4.75
Sample Tonnage:	-	Cylinder Diameter (mm):	75
Sample ID:	Sample 1	Nominal Size (mm):	150
		Rock Type:	Spalls

TEST RESULTS

Ten Percent Fines, Dry	(kN)	231
Ten Percent Fines, Wet	(kN)	142
Wet/Dry Variation	(%)	38

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements in this document are traceable to Australian/national standards.

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

dg5057li.docx

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK. QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CALIFORNIA BEARING RATIO TEST REPORT (Q113A)

CLIENT: GROUNDWORK PLUS

REPORT No.: 2

PROJECT: -

JOB No.: CQAK/11/022

JOB DESCRIPTION: COMPLIANCE TESTING

DATE: 16 OCTOBER 2012

Sample No.: DK/12/1383

Sample ID: Sample 1

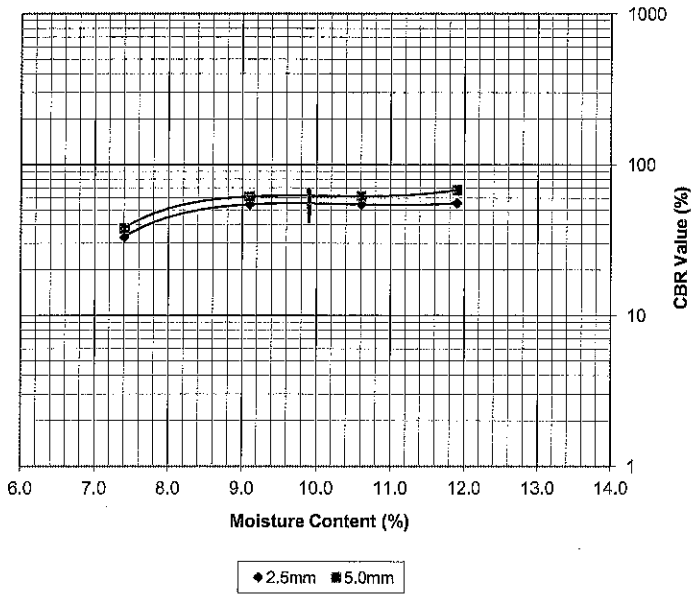
Material Type: -

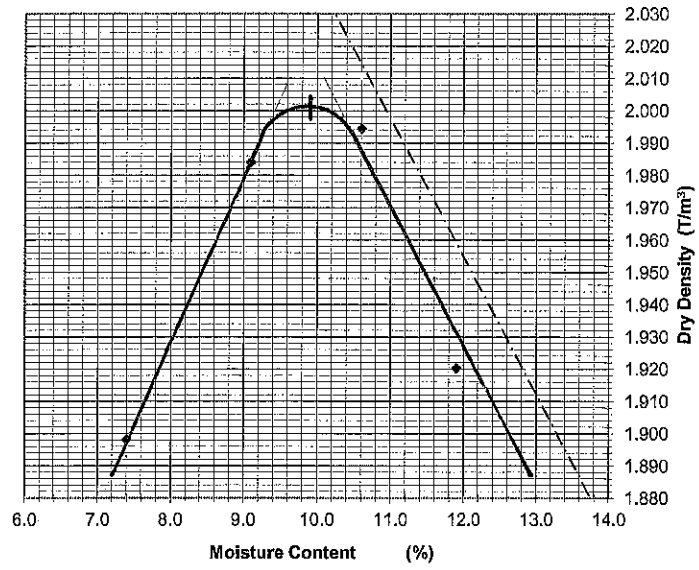
Sample Location: -

Date Sampled: -

Date Tested: 11/10/2012

Sampled By: Client





Initial M.C. (%)	Dry Density (T/m^3)	CBR 2.5mm (%)	CBR 5.0mm (%)	Swell (%)	Final M.C. (%)
7.4	1.898	32	38	0.0	-
9.1	1.984	54	62	0.0	-
10.6	1.994	54	62	0.0	-
11.9	1.920	56	68	0.0	-
-	-	-	-	-	-
-	-	-	-	-	-

Compactive Effort		100 % Standard
Test Condition		Soaked - 4 day
CBR MDD	(T/m^3)	2.00
CBR OMC	(%)	10.0
CBR 2.5mm	(%)	54
CBR 5.0mm	(%)	62
CBR Value	**(%)**	**62**

Sampling Method: Sampled by client, tested as received

Notes: (i) Sample identification supplied by the client and is not endorsed on this report

DG GREGSON

AUTHORISED SIGNATORY

NATA Accreditation No. 4991

NATA

ACCREDITED FOR TECHNICAL COMPETENCE

This document is issued in accordance with NATA's accreditation requirements.

Accredited for compliance with ISO/IEC 17025

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/14E

TEN PERCENT FINES TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO:	3
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST METHOD**
Determination of the 10% Fines Value (Dry)	Q205A
Determination of the 10% Fines Value (Wet)	Q205B
Wet/Dry Strength Variation	Q205C

SAMPLE IDENTIFICATION

Sample No.:	DK/12/1382	Client Sample No.:	-
Source:	-	Location:	-
Lot No.:	-	Date Sampled:	-
Lot Tonnage:	-	Test Fraction (mm):	13.2-9.5
Sample Tonnage:	-	Cylinder Diameter (mm):	150
Sample ID:	Sample 2	Nominal Size (mm):	150
		Rock Type:	Spalls

TEST RESULTS

Ten Percent Fines, Dry	(kN)	325
Ten Percent Fines, Wet	(kN)	296
Wet/Dry Variation	(%)	9

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements in this document are traceable to Australian/national standards.

dg5057li.docx

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/04D

AGGREGATE TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO:	4
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST METHOD**
Particle Size Distribution (Wet or Dry)	Q103B
Flakiness Index	Q201

SAMPLE IDENTIFICATON

Sample No.:	DK/12/1382	Client Sample No.:	-
Source:	-	Sample ID:	Sample 2
Lot No.:	-	Location:	-
Lot Tonnage:	-	Date Sampled:	-
Sample Tonnage:	-		

TEST RESULTS

Particle Size Distribution

Sieve Size (mm)	% Passing
37.5	100
26.5	97
19.0	68
13.2	26
9.5	16
6.7	11
4.75	8.1
2.36	5.0

Flakiness Index (%) 24

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556
OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/08C

DEGRADATION FACTOR TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO.	5
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST METHOD**
Degradation Factor (Coarse Aggregate)	Q208A

SAMPLE IDENTIFICATION

Sample No.:	DK/12/1382	Client Sample No.:	-
Source:	-	Sample ID:	Sample 2
Lot No.:	-	Location:	-
Lot Tonnage:	-	Date Sampled:	-
Sample Tonnage:	-		

TEST RESULTS

Washington Degradation Factor	70

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

dg5059li.docx

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/40A

LOS ANGELES ABRASION TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO:	6
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST PROCEDURE NO.**
Los Angeles Abrasion Value	Q 206

SAMPLE PROCEDURE	**SAMPLE PROCEDURE NO.**
Sampled by client	-

SAMPLE IDENTIFICATION

Laboratory Sample No.		DK/12/1382
Source		-
Sample ID		Sample 2
Location		-
Lot No.		-
Senders No.		-

TEST RESULTS

Test Grading		B 25% Flaky
Los Angeles Abrasion Value	(%)	13

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

dg5060li.docx

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/26C

PARTICLE DENSITY AND WATER ABSORPTION TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO:	7
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST PROCEDURE NO.**
Particle Density and Water Absorption (Coarse Aggregate)	Q214B

SAMPLE IDENTIFICATION

Laboratory Sample No.	DK/12/1382
Source	-
Sample ID	Sample 2
Location	-
Lot No.	-
Senders No.	-

TEST RESULTS

Apparent Particle Density	(t/m^3)	2.732
Particle Density Dry Basis	(t/m^3)	2.711
Particle Density (SSD)	(t/m^3)	2.719
Water Absorption	(%)	0.29

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

dg5061ll.docx

CIVIL QUALITY ASSURANCE (QLD) PTY LTD

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK. QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/035

POLISHED AGGREGATE FRICTION VALUE

CLIENT: GROUNDWORK PLUS — REPORT No.: 8

PROJECT: - — JOB No.: CQAK/11/022

JOB DESCRIPTION: COMPLIANCE TESTING — DATE: 16 OCTOBER 2012

TEST PROCEDURE	**TEST PROCEDURE No.**
Polished Aggregate Friction Value	Q203

SAMPLE INDENTIFICATION

Sample Number:	DK/12/1382
Lot Number:	-
Material Source:	-
Sample Location:	-
Sample ID:	Sample 2
Geological Classification:	-
Date Sampled:	-
Sampled By:	Client
Date Tested:	-

TEST RESULTS

Air Temperature:	(^{0}C)	23
Corrected Initial Reference Friction Value:		75
Reference PAFV:		51
Corrected Initial Test Sample Friction Value:		78
Test Sample PAFV:		**56**

Variation(s) to Test Method:

Remarks:

Sampling Method: Sampled by client, tested as received

Notes: (i) Sample identification supplied by the client and is not endorsed on this report

DG GREGSON

AUTHORISED SIGNATORY

NATA Accreditation No. 4991

NATA

ACCREDITED FOR TECHNICAL COMPETENCE

This document is issued in accordance with NATA's accreditation requirements.

Accredited for compliance with ISO/IEC 17025

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/14E

TEN PERCENT FINES TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO:	9
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST METHOD**
Determination of the 10% Fines Value (Dry)	Q205A
Determination of the 10% Fines Value (Wet)	Q205B
Wet/Dry Strength Variation	Q205C

SAMPLE IDENTIFICATION

Sample No.:	DK/12/1384	Client Sample No.:	-
Source:	-	Location:	-
Lot No.:	-	Date Sampled:	-
Lot Tonnage:	-	Test Fraction (mm):	6.7-4.75
Sample Tonnage:	-	Cylinder Diameter (mm):	75
Sample ID:	Sample 3	Nominal Size (mm):	150
		Rock Type:	Spalls

TEST RESULTS

Ten Percent Fines, Dry	(kN)	219
Ten Percent Fines, Wet	(kN)	153
Wet/Dry Variation	(%)	30

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements in this document are traceable to Australian/national standards.

dg5057li.docx

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/04D

AGGREGATE TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO:	10
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST METHOD**
Particle Size Distribution (Wet or Dry)	Q103B
Flakiness Index	Q201

SAMPLE IDENTIFICATON

Sample No.:	DK/12/1384	Client Sample No.:	-
Source:	-	Sample ID:	Sample 3
Lot No.:	-	Location:	-
Lot Tonnage:	-	Date Sampled:	-
Sample Tonnage:	-		

TEST RESULTS

Particle Size Distribution

Sieve Size (mm)	% Passing
37.5	100
26.5	98
19.0	76
13.2	39
9.5	24
6.7	16
4.75	11
2.36	6.7

Flakiness Index (%) 30

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/08C

DEGRADATION FACTOR TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO.	11
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST METHOD**
Degradation Factor (Coarse Aggregate)	Q208A

SAMPLE IDENTIFICATION

Sample No.:	DK/12/1384	Client Sample No.:	-
Source:	-	Sample ID:	Sample 3
Lot No.:	-	Location:	-
Lot Tonnage:	-	Date Sampled:	-
Sample Tonnage:	-		

TEST RESULTS

Washington Degradation Factor	47

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/40A

LOS ANGELES ABRASION TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO:	12
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST PROCEDURE NO.**
Los Angeles Abrasion Value	Q 206

SAMPLE PROCEDURE	**SAMPLE PROCEDURE NO.**
Sampled by client	-

SAMPLE IDENTIFICATION

Laboratory Sample No.		DK/12/1384
Source		-
Sample ID		Sample 3
Location		-
Lot No.		-
Senders No.		-

TEST RESULTS

Test Grading		B 25% Flaky
Los Angeles Abrasion Value	(%)	15

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

dg5060li.docx

CIVIL QUALITY ASSURANCE (QLD) PTY. LTD.

GEOTECHNICAL CONSULTANTS

2/74 ENTERPRISE STREET, KUNDA PARK, QLD 4556

OFFICE: (07) 5450 1735 FAX: (07) 5450 1535

CQA/R/26C

PARTICLE DENSITY AND WATER ABSORPTION TEST REPORT

CLIENT:	GROUNDWORK PLUS	REPORT NO:	13
PROJECT:	-	JOB NO:	CQAK/11/022
JOB DESCRIPTION:	COMPLIANCE TESTING	DATE:	16 OCTOBER 2012
DATE SUPPLIED:	27 SEPTEMBER 2012		

TEST PROCEDURE	**TEST PROCEDURE NO.**
Particle Density and Water Absorption (Coarse Aggregate)	Q214B

SAMPLE IDENTIFICATION

Laboratory Sample No.	DK/12/1384
Source	-
Sample ID	Sample 3
Location	-
Lot No.	-
Senders No.	-

TEST RESULTS

Apparent Particle Density	(t/m^3)	2.777
Particle Density Dry Basis	(t/m^3)	2.726
Particle Density (SSD)	(t/m^3)	2.745
Water Absorption	(%)	0.67

Sampling Method: Sampled by client, tested as received
Notes: (i) Sample identification supplied by the client and is not endorsed on this report

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

DG GREGSON
AUTHORISED SIGNATORY
NATA Accreditation No. 4991

Appendix 6

Orishot Manual

ORIshot

Multifunction Orientation Instrument

USER MANUAL

CNPS100

This user manual explains how to use, configure and maintain the ORIshot orientation system. Please read and ensure you understand these guidelines before using the product.

Disclaimer

While every effort has been made to ensure that the information contained in the guide is accurate and complete, no liability can be accepted for any errors or omissions. Coretell reserves the right to change the specifications of the system described herein at any time without prior notice.

No part of this guide may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language in any form, by any means, without the prior written permission of Coretell.

Coretell makes no warranties for damages resulting from corrupted or lost data due to incorrect use or any malfunction of the ORIshot system.

Copyright © 2011 Coretell. All rights reserved.

Table of contents

ORIshot Multifunction Orientation Instrument 1

Disclaimer 2

Table of contents 3

Introduction 5

ORIshot System 5

- Handset 5
- ORIshot probe 6

Menu Options 7

- Pairing 7
- Display Settings 8
- ORIshot Settings 9
- Info 9
- Date and Time 10
- Battery Level 10
- Zero Roll Adjust 11
- Survey Timeout 12

Main Screen 13

- Operating Modes 13

Starting a new survey 14

- Multi Use – Multiple probes 15
- Resume Take Measurement 16

Copyright © 2011 Coretell. All rights reserved.

Recovering Data 17
Viewing Survey data 18
No Response message 19
Changing batteries 20
Handset 20
ORIshot Probe 21
Calibration and Handling 22
Final Word 22
Specifications 23

Copyright © 2011 Coretell. All rights reserved.
MRK-00012, RA4

Introduction

Congratulations! You are using the latest in digital survey instrumentation for down-hole exploration.

This user guide provides all the information you will need to use and care for your product.

ORIshot System

Handset

The ORIshot handset provides wireless connectivity to any ORIshot probe. You can configure, start a survey and analyse survey data effortlessly.

ORIshot handset layout and key button functions:

1. Change system settings
2. Recover data from the probe
3. View survey data stored on the handset
4. Handset on/off button
5. Turn on LCD backlight
6. Navigation keypad
7. Take a survey (shot)
8. Start a new survey
9. Display

Copyright © 2011 Coretell. All rights reserved.

ORIshot probe

The ORIshot probe is assembled as a single unit with a plastic sleeve screwed into a steel casing. The top of the plastic sleeve houses the wireless communications window and has the ORIshot probe identification number engraved into it.

The communications window enables the ORIshot probe to communicate to the handset using wireless technology.

Note: In order to ensure reliable communication between the Handset and ORIshot probe, please ensure the communications window is clearly visible when initiating a survey or downloading survey data (i.e. not covered or underground).

1. Wireless communications window

LED Light

A flashing LED light is visible behind the wireless communications window to indicate the ORIshot probe status.

LED Colour	Frequency	Status
Green	7 sec	Paired as a **GREEN** ORIshot
RED	7 sec	Paired as a **RED** ORIshot
GREEN	2 sec	**GREEN** ORIshot has data
RED	2 sec	**RED** ORIshot has data
GREEN/RED	7 sec or > 1 sec	ORIshot not yet paired to handset
RED	> 1 sec	Please call technical support
None	0	Possible Flat Battery

Copyright © 2011 Coretell. All rights reserved.

Menu Options

Pairing

The ORIshot probe can be used with any ORIshot handset by following the pairing process. The ORIshot handset can be paired to two ORIshot probes simultaneously.

To pair a handset to a probe, please follow these steps:

1. Press the <Settings> button
2. Select “Ori pairing” from the menu
3. Select “Manual SN entry”
4. Select the Ori probe colour assignment. You can specify an Ori probe to be either **RED** or **GREEN**.
5. Enter the probe serial number (this probe serial number can be found engraved into the wireless communications window.
6. Press <OK>
7. If this is the first attempt at pairing the handset to the Ori, a pin code will be requested (disabled by default). Press <OK> to continue.
8. The display will show “Pairing to Device, Please Wait”, then “Connection to Ori successful.”

The handset is now paired to the probe and can be used to conduct surveys.

An LED light visible through the wireless communications window will now flash red or green to indicate the colour assigned to it.

If you receive an error message while pairing, please go to the “No Response message” section at the back of this user manual.

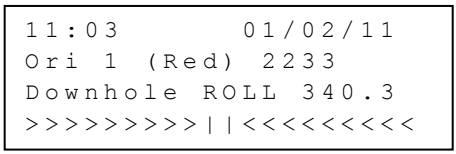
Copyright © 2011 Coretell. All rights reserved.
MRK-00012, RA4

Display Settings

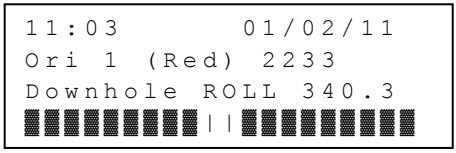
The ORIshot system provides a number of options to customise how the survey data is displayed. These options can be changed in the "Display Settings" menu. This menu can be found by pressing the <Settings> button and then scrolling down to "Display Settings".

The optional display settings are:

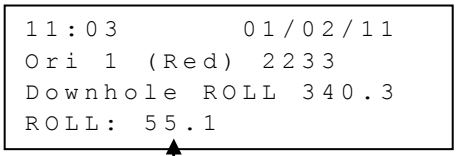
- **Arrows:** *Shows the survey data as a series of arrows.*



- **Bars:** *Shows the survey data as a series of bars*



- **Real-time ROLL**: *Displays the survey and real-time ROLL of the probe.*



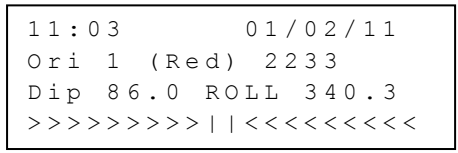
This number will change as you rotate the ORIshot probe. Top dead centre is located when the two ROLL numbers match.

Copyright © 2011 Coretell. All rights reserved.
MRK-00012, RA4

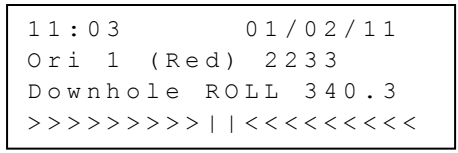
ORIshot Settings

Enables the user to show or hide the DIP information when viewing the survey data. Simply press the <Settings> button, then select "Ori Settings" from the menu and select the desired setting.

Screen layout (Show DIP):



Screen layout (Hide DIP):

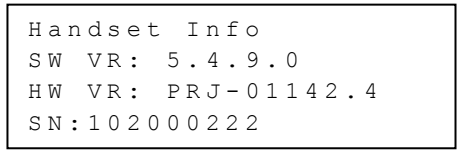


Info

To view the current software version of the handset or probe, please follow these steps:

1. Press the <Settings> button
2. Select "Info" from the menu
3. Select "Handset" or "Ori device"

The following screen will be displayed (or similar):



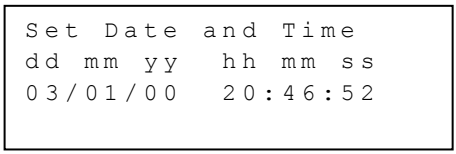
Copyright © 2011 Coretell. All rights reserved.

Date and Time

To set the date and time of the ORIshot system, please follow these steps:

1. Press the <Settings> button
2. Select “Date and Time” from the menu
3. Set the date and time using the <Arrow> keys
4. Press <OK> when you have finished

The following screen will be displayed:

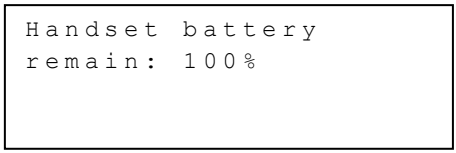


Battery Level

To check the battery level of the ORIshot handset, please follow these steps:

1. Press the <Settings> button
2. Select “Battery Level” from the menu
3. Battery level will be displayed

The following screen will be displayed:



Copyright © 2011 Coretell. All rights reserved.

Zero Roll Adjust

The ORIshot probe can be zeroed to any roll angle. To zero the ORIshot probe, please follow these steps:

1. Press the <Settings> button
2. Select “Zero Roll Adjust” from the menu
3. Select your Ori device using the up & down arrows, then press <OK>
4. Press <OK> to perform a zero roll adjustment. The ORIshot probe ROLL will now read zero at the current position.

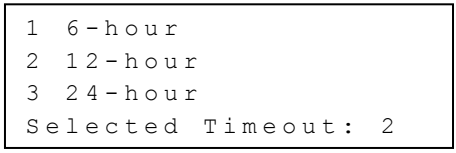
Please note: *The probe must be within communications distance from the handset to perform this function. Ensure the handset is no more than 2 meters from the probe.*

Copyright © 2011 Coretell. All rights reserved.
MRK-00012, RA4

Survey Timeout

The ORIshot probe has a user selectable survey timeout feature. Use the survey timeout feature to set the maximum duration of any survey. Setting a survey timeout will ensure the ORIshot battery is not drained by leaving the probe in survey mode.

1. Press the <Settings> button
2. Select “Survey Timeout” from the menu
3. Select your desired timeout period using the up & down arrows to select between timeout options 1 (6hrs), 2 (12hrs) and 3 (24hrs).
4. then press <OK>



Please note: ***If data is not recovered within the survey timeout period, a new survey will need to be started.***

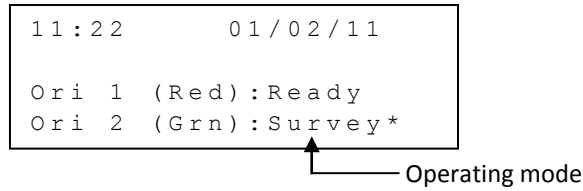
Copyright © 2011 Coretell. All rights reserved.

Main Screen

The ORIshot system allows the user to control two ORIshot probes with a single handset.

The main screen indicates which ORIshot probes are paired to the handset; it also indicates the operating mode of each ORIshot probe (please see below for information on operating modes).

Main screen layout: The below screen shows this particular handset is paired to two ORIshot probes. ORIshot probe 1 is **ready** to start a new survey; ORIshot probe 2 is currently in **survey** mode.



Main screen: Example

Operating Modes

The Ori probes can be in one of three operational modes:

- **Ready:** *The Ori probe is not being used and is ready to start a new survey.*
- **Survey*:** *The Ori probe is currently being used to conduct a survey. No measurement (shot) has been taken.*
- **Survey:** *The Ori probe is currently being used to conduct a survey. A measurement (shot) has been taken and the* ORIshot probe is ready for retrieval.
- **Data:** *The survey has been completed and data from the Ori probe has been downloaded to the handset.*

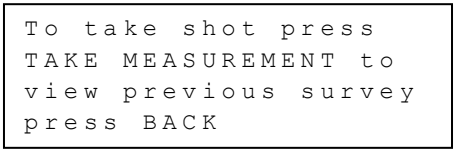
Copyright © 2011 Coretell. All rights reserved.
MRK-00012, RA4

Starting a new survey

To start a new survey simply press the <New Survey> button on the handset and follow the on-screen instructions.

After pressing <New Survey>, please follow these steps:

1. Select the ORIshot probe you wish to use, and press <OK>
2. If the ORIshot probe has been used previously the handset will display the following warning message “Are you sure you wish to overwrite survey data on this Ori?”
3. Press <OK> to overwrite old data and continue
4. The handset will connect to the Ori probe and initiate survey mode.
5. With the ORIshot probe in position on core, press <Take Measurement> to take a shot. Do not move the Ori probe while a shot is being taken. Moving the Ori probe will reduce the reliability of the survey data.

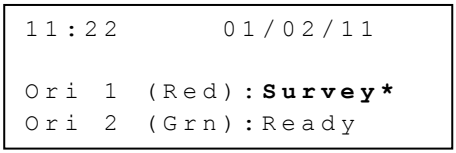


Copyright © 2011 Coretell. All rights reserved.

Multi Use – Multiple probes

Once a survey has been initiated you can press the <BACK> key and continue using the handset to perform other functions while waiting to take a measurement. This allows you to view data or initiate a survey on the second ORIshot probe at the same time.

When you press the <BACK> key the handset will show that the ORIshot probe is in **Survey*** mode but no measurement has been taken (indicated by an asterisk).



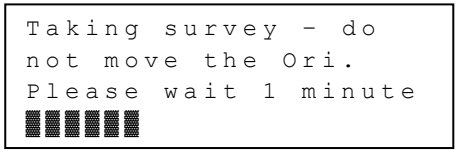
Copyright © 2011 Coretell. All rights reserved.

Resume Take Measurement

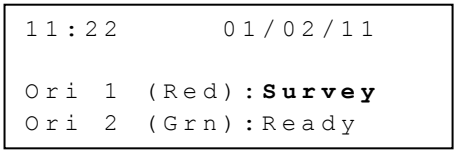
When the measurement (shot) is ready to be taken simply resume the survey by pressing <New Survey> and select the desired ORIshot probe. You can now press <Take Measurement> to take a shot.

A message will be displayed: “Stabilse the Ori, and press OK.”

Press the <OK> button to take the shot.



Once the survey has been completed the handset will show that the Ori probe is in **Survey** mode and that a measurement has been taken (i.e. no asterisk).

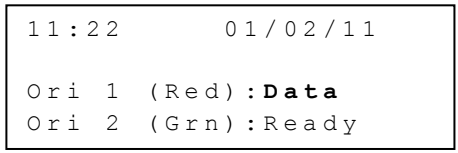


Copyright © 2011 Coretell. All rights reserved.

Recovering Data

When the survey has been completed pull the Ori probe out of the hole and press <Recover Data>. The handset will now download survey data from the selected ORIshot probe ready for viewing.

The handset will show that the ORIshot probe has **Data** ready for viewing.



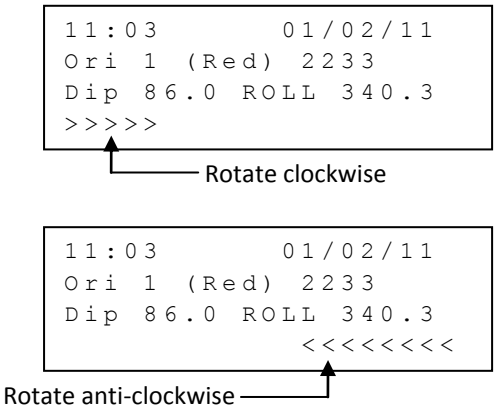
Please note: *The probe must be within communications distance from the handset to initiate a survey or to recover data, ensure the handset is no more than 2 meters from the probe. Once the survey has been initiated it is ready to be placed down the hole.*

Copyright © 2011 Coretell. All rights reserved.
MRK-00012, RA4

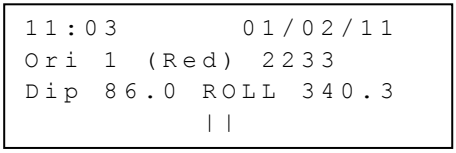
Viewing Survey data

To view survey data press the <View Data> key and select the desired ORIshot probe.

The following screen will be displayed showing the current orientation of the ORIshot probe.



Use the arrows or bars on the screen to rotate the ORIshot probe to the correct position. The screen will show two bars when the core is aligned.



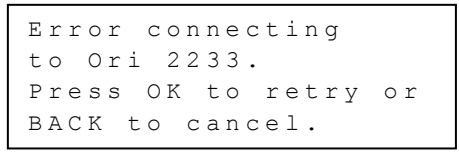
Core aligned: Example

Copyright © 2011 Coretell. All rights reserved.

No Response message

The ORIshot system uses wireless technology for communication between the handset and the probe and avoids the need for wires, direct line of sight or for the user to disassemble the probe to download survey data.

In some circumstances the handset may not be able to communicate to the probe. When this occurs the following screen is displayed.



This may be caused by a number of reasons. If you see this message please review the following checklist and press <OK> to retry:

- Ensure the distance between the handset and the probe is no more than 2 meters
- Ensure there are no obstacles between the handset and the probe
- Ensure the communications window is clearly visible (i.e. not covered or underground)
- Check that the ORIshot probe LED is flashing, if no flashing can be seen please check the batteries

Copyright © 2011 Coretell. All rights reserved.
MRK-00012, RA4

Changing batteries

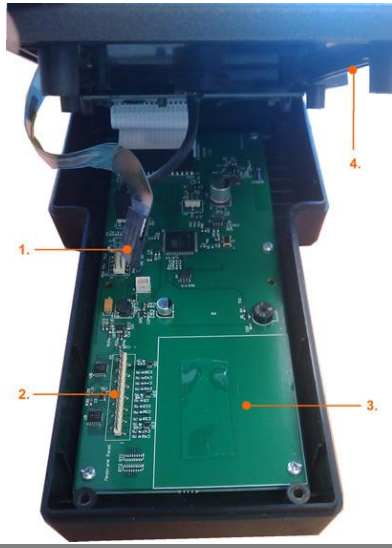
The ORIshot has been designed to allow the user to change the handset and probe batteries.

Please note: *Batteries must be purchased from Coretell. The use of unapproved batteries will void the product warranty and may damage the ORIshot's internal circuitry.*

Handset

To change the handset battery, please follow these steps:

1. Unscrew the six screws
2. Gently open the handset, disconnecting the keypad cable from the keypad connector
3. Disconnect the old battery
4. Remove the old battery and replace with the new battery
5. Connect the keypad cable and fasten screws



1. Keypad cable
2. Keypad connector
3. Area reserved for battery
4. Gasket seal channel

Please ensure that the battery is securely mounted with minimal movement and that the gasket seal is in place before fastening screws.

Copyright © 2011 Coretell. All rights reserved.
MRK-00012, RA4

ORIshot Probe

To change the Ori probe battery, please follow these steps:

1. Unscrew the plastic sleeve from the metal casing
2. The battery pack can be removed by gently twisting the plastic casing at the join point (approximately halfway down)
3. Disconnect the existing battery and replace with the new battery (as supplied by Coretell)
4. Pair the ORIshot probe with the handset to ensure the system is working correctly after battery replacement
5. Ensure O-rings are in place and fasten battery into place
6. Screw the plastic sleeve back into the metal casing

1. Coretell approved battery
2. Battery connector
3. O-Ring seals
4. Threaded housing (screwed into metal casing)
5. Wireless communications w i n d o w

Copyright © 2011 Coretell. All rights reserved.
MRK-00012, RA4

Calibration and Handling

The ORIshot probe has been calibrated to a high level of precision – please see Specifications for more details.

The ORIshot probe is a precision instrument and therefore should be treated with care. Extreme temperatures, heavy impacts, severe vibrations or general rough handling will reduce the accuracy of the probe and may damage the internal circuitry.

It is recommended that the Orishot probe be returned for maintenance and recalibration every 12 months to ensure a high level of precision and reliability is maintained in the field.

Final Word

Thank-you for choosing the Coretell ORIshot system.

The ORIshot system has been designed for accuracy, ease of use, and low maintenance, ensuring you get the maximum return on your investment.

If you have any queries or comments about the ORIshot system or wish to learn more about our range of mining instrumentation, please visit our website at www.coretell.com.au.

We hope you enjoy using the ORIshot camera system.

The Coretell Team.

Copyright © 2011 Coretell. All rights reserved.
MRK-00012, RA4

Specifications

ORIshot Probe	
Part Number	CNPS100
Operational temperature	-10°C to +70°C (+14°F to +158°F)
Storage temperature	-10°C to +120°C (14°F to +248°F)
Operating time	2 years (depending upon use)
Inclination accuracy	± 0.4 RMS*
Azimuth accuracy	± 0.4 RMS*
Power source	Alkaline battery (Non-rechargeable)
Communication	Wireless ISM 2.4GHz
Communication distance	1.5 – 2.0 meters
Ingress Rating	IP67

**It is recommended that the ORIshot Camera is calibrated every 12 months to ensure accuracy is maintained.*

ORIshot Handset	
Part Number	CNH100
Operational temperature	0°C to +60°C (+32°F to +140°F)
Storage temperature	-10°C to +120°C (14°F to +248°F)
Operating time	2 years (depending upon use)
Power source	Alkaline battery (Non-rechargeable)
Communication	Wireless ISM 2.4GHz
Ingress Rating	IP65

NOTE: Specifications subject to change without notice.

Copyright © 2011 Coretell. All rights reserved.
MRK-00012, RA4

Appendix 7

UNDERSTANDING YOUR GEOLOGICAL REPORT

APPENDIX 7 – IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL REPORT

These notes have been collated by Groundwork Plus. They are designed to help you in the interpretation of your Report.

Geological studies are commissioned to gain information about environmental conditions on and beneath the surface of a site. The more comprehensive the study, the more reliable the assessment is likely to be, but remember, any such assessment is to a greater or lesser extent based on professional opinions about conditions that cannot be seen or tested. Accordingly, no matter how much data is accumulated, risks created by unanticipated conditions will always remain. Work with your geological consultant to manage known and unknown risks. Part of that process should already have been accomplished, through the risk allocation provisions you and your geological professional discussed and included in your contract's general terms and conditions. This document is intended to explain some of the concepts that may be included in your agreement and to pass along information and suggestions to help you manage your risk.

Beware Of Change; Keep Your Geological Professional Advised

The design of a geological study considers a variety of factors that are subject to change. Changes can undermine the applicability of a reports findings, conclusions, and recommendations. Advise your geological professional about any changes as you become aware of them. Geological professionals cannot accept responsibility or liability for problems that occur because a report fails to consider conditions that did not exist when the study was designed. Ask your geological professional about the types of changes you should be particularly alert to. Some of the most common include:

- modification of the proposed development or ownership group;
- sale or other property transfer;
- replacement of or additions to the financing entity;
- amendment of existing regulations or introduction of new ones; or
- changes in the use or condition of adjacent property.

Should you become aware of any change, do not rely on an existing geological report. Advise your geological professional immediately; follow the professional's advice.

Prepare To Deal with Unanticipated Conditions

The findings, recommendations, and conclusions of a report typically are based on a review of historical information, interviews, a site 'walkover' and other forms of non-invasive research. When site subsurface conditions are not sampled in any way, the risk of unanticipated conditions is higher than it would otherwise be.

While borings, installation of monitoring wells, and similar invasive test methods can help reduce the risk of unanticipated conditions, do not overvalue the effectiveness of testing. Testing provides information about actual conditions only at the precise locations where samples are taken and only when they are taken. Your geological professional has applied that specific information to develop a general opinion about environmental conditions. Actual conditions in areas not sampled may differ (sometimes sharply) from those predicted in a report. For example, a site may contain an unregistered underground storage tank that shows no surface trace of its existence. Even conditions in areas that were tested can change, sometimes suddenly, due to any number of events, not the least of which include occurrences at adjacent sites. Recognize too, that even some conditions in tested areas may go undiscovered, because the tests or analytical methods used were designed to detect only those conditions assumed to exist.

Manage your risks by retaining your geological professional to work with you as the project proceeds. Establish a contingency fund or other means to enable your geological professional to respond rapidly, in order to limit the impact of unforeseen conditions. To help prevent any misunderstanding, identify those empowered to authorize changes and the administrative procedures that should be followed.

Do Not Permit Any Other Party to Rely On The Report

Geological professionals design their studies and prepare their reports to meet the specific needs of the clients who retain them, in light of the risk management methods that the client and geological professionals agree to, and the statutory, regulatory, or other requirements that apply. The study designed for a developer may differ sharply from one designed for

a lender, insurer, public agency or even another developer. Unless the report specifically states otherwise, it was developed for you and only you. Do not unilaterally permit any other party to rely on it. The report and the study underlying it may not be adequate for another party's needs and you could be held liable, for shortcomings your geological professional was powerless to prevent or anticipate. Inform your geological professional when you know or expect that someone else - a third-party will want to use or rely on the report. Do not permit third-party use or reliance until you first confer with the Geological professional who prepared the report. Additional testing, analysis, or study may be required and in any event, appropriate terms and conditions should be agreed to so both you and your geological professional are protected from third-party risks. Any party who relies on a geological report without the express written permission of the professional who prepared it and the client for whom it was prepared may be solely liable for any problems that arise.

Avoid Misinterpretation of the Report

Design professionals and other parties may want to rely on the report in developing plans and specifications. They need to be advised, in writing, that their needs may not have been considered when the study's scope was developed and even if their needs were considered, they might misinterpret geological findings, conclusions, and recommendations. Commission your geological professional to explain pertinent elements of the report to others who are permitted to rely on it and to review any plans, specifications or other instruments of professional service that incorporate any of the report's findings, conclusions, or recommendations. Your geological professional has the best understanding of the issues involved, including the fundamental assumptions that determined the study's scope.

Give Contractors Access to the Report

Reduce the risk of delays, claims, and disputes by giving contractors access to the full report, providing that it is accompanied by a letter of transmittal that can protect you by making it unquestionably clear that: l) the study was not conducted and the report was not prepared for purposes of bid development and 2) the findings, conclusions and recommendations included in the report are based on a variety of opinions, inferences, and assumptions and are subject to interpretation. Use the letter to also advise contractors to consult with your geological professional to obtain clarifications, interpretations, and guidance (a fee may be required for this service) and that-in any event, they should conduct additional studies to obtain the specific type and extent of information each prefers for preparing a bid or cost estimate. Providing access to the full report, with the appropriate caveats, helps prevent formation of adversarial attitudes and claims of concealed or differing conditions. If a contractor elects to ignore the warnings and advice in the letter of transmittal, it would do so at its own risk. Your geological professional should be able to help you prepare an effective letter.

Do Not Separate Documentation from the Report

Geological reports often include supplementary documentation, such as maps and copies of regulatory files, permits, registrations, citations, and correspondence with regulatory agencies. If subsurface explorations were performed, the report may contain final boring logs and copies of laboratory data. If remediation activities occurred on site, the report may include; copies of daily field reports, waste manifests and information about the disturbance of subsurface materials, the type and thickness of any fill placed on site and fill placement practices, among other types of documentation. Do not separate supplementary documentation from the report. Do not permit any other party to redraw or modify any of the supplementary documentation for incorporation into other professionals' instruments of service.

Realize That Recommendations May Not Be Final

The technical recommendations included in a geological report are based on assumptions about actual conditions and so are preliminary or tentative. Final recommendations can be prepared only by observing actual conditions as they are exposed. For that reason, you should retain your geological professional to observe construction and/or remediation activities on site, to permit rapid response to unanticipated conditions. The geological professional who prepared the report cannot assume responsibility or liability for the report's recommendations if that professional is not retained to observe relevant site operations.

Understand That Geotechnical Issues Have Not Been Addressed

Unless geotechnical engineering was specifically included in the scope of professional service, a report is not likely to relate any findings, conclusions, or recommendations about the suitability of subsurface materials for construction purposes, especially when site remediation has been accomplished through the removal, replacement, encapsulation, or

chemical treatment of on- site soils. The equipment, techniques, and testing used by geotechnical engineers differ markedly from those used by Geological professionals; their education, training, and experience are also significantly different. If you plan to build on the subject site, but have not yet had a geotechnical engineering study conducted, your Geological professional should be able to provide guidance about the next steps you should take. The same firm may provide the services you need.

Read Responsibility Provisions Closely

Geological studies cannot be exact; they are based on professional judgement and opinion. Nonetheless, some clients, contractors, and others assume geological reports are, or certainly should be, unerringly precise. Such assumptions have created unrealistic expectations that have led to wholly unwarranted claims and disputes. To help prevent such problems, geological professionals have developed a number of report provisions and contract terms that explain who is responsible for what and how risks are to be allocated. Some people mistake these for 'exculpatory clauses', that is, provisions whose purpose is to transfer one party's rightful responsibilities and liabilities to someone else. Read the responsibility provisions included in a report and in the contract you and your Geological professional agreed to.

Appendix 8

Digital Data